


复旦大学数学科学学院
数学综合报告会

报告题目：Output feedback stabilization for heat equations with sampled-data controls

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报告摘要： In this talk, we build up an output feedback law to stabilize a sampled-data controlled heat equation (with a potential) in a bounded domain. The feedback law abides the following rules: First, we divide equally the time interval $[0,+\infty)$ into infinitely many disjoint time periods, and divide each time period into three disjoint subintervals. Second, for each time period, we observe a solution over an open subset of the space domain in the first subinterval; take sample from outputs at one time point of the first subinterval; add a time-invariant output feedback control over another open subset of Ω in the second subinterval; let the equation evolve free in the last subinterval. Thus, the corresponding feedback control is of sampled-data. Our feedback law has the following advantages: the sampling period (which is the length of the above time period) can be arbitrarily taken; the feedback law has an explicit expression in terms of the sampling period; the behaviors of the norm of the feedback law, when the sampling period goes to zero or infinity, are clear. The construction of the feedback law is based on two kinds of approximate null-controllability for heat equations. One has time-invariant controls, while another has impulse controls. The studies of the aforementioned controllability with time-invariant controls need a new observability inequality for heat equations built up in the current work. This is a joint work with Hangbing Liu and Gengsheng Wang.

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